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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,508	01/23/2004	Christian Velez	FRG-15267	7237
40854	7590	03/30/2005	EXAMINER	
RANKIN, HILL, PORTER & CLARK LLP 4080 ERIE STREET WILLOUGHBY, OH 44094-7836			LOUIE, WAI SING	
			ART UNIT	PAPER NUMBER
			2814	
DATE MAILED: 03/30/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/763,508

Applicant(s)

VELEZ ET AL.

Examiner

Wai-Sing Louie

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/26/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 and 5-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Fouquet (US 5,252,839).

With regard to claims 1-2, 9, and 18, Fouquet discloses a superluminescent light-emitting diode (col. 4, line 39 to col. 9, line 68 and fig. 2) comprising:

- a pn junction 56 and 58 (col. 6, lines 10-18 and fig. 2);
- a waveguide 40 and 42 defining an optical beam path (col. 5, line 66 to col. 6, line 3 and fig. 2);
- a heterostructure including a gain region 50 and an absorber region 52 in series with the gain region 50 in the optical beam path (col. 6, lines 7-10);
- a first contact means for applying a voltage to the pn junction in its forward direction in the gain region (fig. 5), so as to produce light emission from the gain region 50 and along the optical beam path (col. 6, lines 25-28);
- a second contact means contacting the pn junction in the absorber region 52 (fig. 5) and operable to remove charge carriers generated by absorption in the absorber

region 52 at zero bias (col. 6, lines 12-18 and col. 8, line 28), the second contact means not being connected to an active voltage source (col. 6, lines 36-40);

- the waveguide comprises two end facets, the end facets being perpendicular to the optical beam path (col. 6, lines 25-30 and fig. 2).

With regard to claim 3, Fouquet discloses the pn junction comprises an n-doped side 42 and where at least of the n-doped side 42 and the p-doped side 40 is connected, by the second contact means, to a metallic surface 56 outside the heterostructure (fig. 2b).

With regard to claims 5 and 8, Fouquet discloses the semiconductor heterostructure in the gain region 50 comprises:

- a multiple quantum well (MQW) structure 32 (col. 5, lines 55-62) where the pn junction is formed in the MQW structure (fig. 2);
- a first n-doped cladding layer 42 being in electrical contact to a first metal electrode 54 and a second p-doped cladding layer 40 being in electrical contact to a second metal electrode 58 (fig. 2);
- the first and second electrodes 54 and 58 being interrupted between the gain region 50 and absorber region 52 (fig. 2)..

With regard to claims 6-7, Fouquet discloses waveguide layers 40 and 42 (col. 5, lines 67-68) and the waveguide is index guided and gain guided (col. 3, lines 44-50).

With regard to claims 10 and 13, Fouquet discloses the semiconductor heterostructure forming a waveguide structure (layers 40, 32, and 42) defining an optical beam path (col. 5, line 67 to col. 6, line 3 and fig. 2) and including a gain region, the gain emitting, upon injection of a current through contact means 54 to 58, electromagnetic radiation into the optical beam path, the

waveguide structure further including an forward bias (unbiased) pn junction in series with the gain region in the optical beam path (col. 6, lines 7-16 and fig. 2).

With regard to claims 11 and 15, Fouquet discloses the waveguide structure comprises two end facets 60 and 64 limiting the waveguide structure in a longitudinal direction parallel to the optical beam path, the end facets 60 and 64 being perpendicular to the longitudinal direction (col. 6, lines 24-48 and fig. 2).

With regard to claim 12, Fouquet discloses the SLED comprising monitoring means for monitoring a photocurrent (75 mA) generated by radiation emitted in the active region and absorbed in the unbiased pn junction, producing a monitoring signal (75 to 85 dB) being measure of the light emitted in the gain region 50 (col. 8, lines 14-35).

With regard to claim 14, Fouquet discloses the charge carrier reservoir comprises a metallic surface (fig. 2b).

With regard to claims 16-17, in addition to the limitations disclosed in claim 1 above, Fouquet also discloses:

- two end facets 60 and 64 limiting the waveguide structure in a longitudinal direction parallel to the optical beam path, the end facets 60 and 64 being perpendicular to the longitudinal direction (col. 6, lines 24-48 and fig. 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fouquet (US 5,252,839) in view of Swirhun et al. (US 5,577,064).

With regard to claim 4, Fouquet discloses the pn junction in the gain region 50 and in the absorber region 52 is made of bulk semiconductor material (col. 9, line 10) comprising a p-doped component 40 and n-doped component 42, but do not disclose having a layer thickness exceeding 10 nm. However, Swirhun et al. disclose the thickness of the layers reflecting the light emitted from the action region are sized by a general formula $\lambda/4n$, where λ is the wavelength of the light emitted (Swirhun col. 2, lines 29-35). Swirhun et al. teach the SLED design is similar to the VCSEL except the absence of the mirrors and the layer is sized for reduced reflectance (Swirhun col. 2, lines 1-7). Fouquet and Swirhun et al. have substantially the same environment of the SLED. Therefore, it would have been obvious for the one with ordinary skill in the art to modify Fouquet's device with the teaching of Swirhun et al. to size the layer with the formula $\lambda/4n$ in order to reduce reflectance for the device.

Fouquet discloses the wavelength emitted is 1.3 and 1.55 microns and, thus, the thickness of the layer sized by the formula $\lambda/4n$ would exceed 10 nm.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (571) 272-1709. The examiner can normally be reached on 7:30 AM to 4:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wsl
March 24, 2005.

